

REMARKS

Claims 1-6, 14, 20, 21, 23 and 25-32 are pending.

In the Office Action dated February 13, 2009, the Examiner objected to claim 1 because of informalities. Claims 2-6, 20-21, 25-26, and 28-32 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as invention. Claims 2-6, 20-21, 25-26, and 28-32 were further rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter. Claims 1, 14, 23 and 27 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Claim 1 was further rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent no. 6,999,100 to Leather et al. (the "Leather patent"). Claims 23 and 25-32 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,664,955 to Deering (the "Deering patent"). Claims 14 and 20 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Leather patent.

With respect to the Examiner's objection to claim 1 for informalities, claim 1 has been amended, and in its amended form, overcomes the objection. Consequently, the Examiner's objection to claim 1 should be withdrawn.

With respect to the Examiner's rejection of claims 2-6, 20, 21, 25, 26, and 28-32 as being indefinite and the Examiner's rejection of the same claims as being directed to non-statutory subject matter, the amendments to claims 1, 14, 23, and 27 overcome the rejections. In particular, claims 1, 14, 23, and 27 have been amended to recite a method. The rejection of the claims under 35 U.S.C. 112, second paragraph, and under 35 U.S.C. 101 should be withdrawn.

With respect to the Examiner's rejection of claims 1, 14, 23, and 27 as failing to comply with the written description requirement, claims 1, 14, 23, and 27 have been amended to recite methods, as previously discussed. Consequently, the Examiner's rejection under 35 U.S.C. 112, first paragraph, should be withdrawn.

A telephone conference between Examiner Wang and Applicants' representative, Kimton Eng, was conducted on May 5, 2009. During the interview, the Examiner's claim rejections, the subject matter of the Leather and Deering patents was discussed, as well as applicability to the pending claims were discussed. Claims 1, 14, 23, and 27, have been amended in light of the discussion of the rejections, and the applicability of the Leather and

Deering patents to the claims. As amended, the claims are patentably distinct from the Leather and Deering patents.

As previously mentioned, claim 1 has been rejected by the Examiner under 35 U.S.C. 102(e) as being anticipated by the Leather patent.

Claim 1 recites a method for over-sampling pixels of a graphics image that includes calculating in anti-aliasing circuitry less than three sample values for each pixel of the image in accordance with a respective sampling pattern, consecutive pixels alternating between a first and a second sampling pattern, each of the first sampling pattern and the second sampling pattern defining one or more sampling locations, each sampling location having a corresponding sample value calculated, the second sampling pattern corresponding to the first sampling pattern rotated 90 degrees, and the sampling locations relative to a pixel; determining in the anti-aliasing circuitry a respective value for each pixel of the image by combining all the sample values for the pixel, every sampling location of the sampling pattern for the pixel having a corresponding sample value for the combination; and producing in the anti-aliasing circuitry values for the pixels of the image to be saved as graphics data to provide an anti-aliasing effect on the display device.

As discussed in previously submitted responses, the Leather patent describes a graphics system including a custom graphics and audio processor for producing 2D and 3D graphics and surround sound. The system includes a graphics and audio processor including a 3D graphics pipeline and an audio digital signal processor. Full-scene anti-aliasing is implemented by the system through a programmable-location super-sampling arrangement and a selectable-weight vertical-pixel support area blending filter. For a 2x2 pixel group (quad), the locations of three samples within each super-sampled pixel are individually selectable. A multi-sample coverage mask is used to determine which of the twelve samples within a pixel quad are enabled based on the portions of each pixel occupied by a primitive fragment and any pre-computed z-buffering. Each super-sampled pixel is filtered during a copy-out operation from a local memory to an external frame buffer using a pixel blending filter arrangement that combines seven samples from three vertically arranged pixels. Three samples are taken from the current pixel, two samples are taken from a pixel immediately above the current pixel and two samples are taken from a pixel immediately below the current pixel. A weighted average is then computed based on the enabled samples to determine the final color for the pixel.

The Leather patent fails to disclose the combination of limitations recited in claim 1. For example, the Leather patent fails to disclose calculating in anti-aliasing circuitry less than three sample values for each pixel of the image in accordance with a respective sampling pattern, consecutive pixels alternating between a first and a second sampling pattern, each of the first sampling pattern and the second sampling pattern defining one or more sampling locations, each sampling location having a corresponding sample value calculated. The Leather patent further fails to disclose determining in the anti-aliasing circuitry a respective value for each pixel of the image by combining all the sample values for the pixel, every sampling location of the sampling pattern for the pixel having a corresponding sample value for the combination.

For the foregoing reasons, claim 1 is patentably distinct from the Leather patent, and the rejection of claim 1 under 35 U.S.C. 102(e) should be withdrawn.

As previously mentioned, claims 14 and 20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Leather patent.

Claim 14 recites a method for generating an image that includes calculating in anti-aliasing circuitry two sample values per pixel of the image in accordance with a respective one of a plurality of sampling patterns, one pair of sampling positions per sampling pattern and each sample position having a corresponding calculated sample value calculated, a first sampling pattern defines two sample positions symmetrically located relative to a center of a given pixel on opposite sides of a line parallel to a first axis of the image and dividing the respective pixel in half, and a second sampling pattern defines two sample positions symmetrically located relative to a center of a given pixel on opposite sides of a line parallel to a second axis of the image and dividing the respective pixel in half, the second sampling pattern substantially corresponding to the first sampling pattern rotated 90 degrees; calculating in the anti-aliasing circuitry a respective value for each pixel of the image from the two sample values for the pixel, each sample position of the sampling pattern for the pixel having a corresponding sample value for the calculation; and storing in a memory the calculated values for the pixels to be used for providing graphics data for an anti-aliased image to be displayed on a display device.

The Leather patent fails to teach or suggest the combination of limitations recited by claim 14. For example, the Leather patent fails to teach or suggest calculating in anti-aliasing circuitry two sample values per pixel of the image in accordance with a respective one of a plurality of sampling patterns, one pair of sampling positions per sampling pattern and each

sample position having a corresponding calculated sample value calculated. Moreover, the Leather patent fails to teach or suggest calculating in the anti-aliasing circuitry a respective value for each pixel of the image from the two sample values for the pixel, each sample position of the sampling pattern for the pixel having a corresponding sample value for the calculation

For the foregoing reasons, claim 14 is patentable over the Leather patent, and the rejection under 35 U.S.C. 103(a) should be withdrawn. Claim 20 is similarly patentable based on at least its dependency from allowable base claim 14. Therefore, the rejection of claims 14 and 20 under 35 U.S.C. 103(a) should be withdrawn.

As previously mentioned, claims 23 and 25-32 have been rejected under 35 U.S.C. 102(e) as being anticipated by the Deering patent.

As discussed in previously submitted responses, the Deering patent describes a method and computer graphics system capable of super-sampling and performing real-time convolution. The computer graphics system includes a graphics processor for generating a plurality of samples, and further includes a sample buffer to store the samples. A sample-to-pixel calculation unit is programmable to generate a first subset of pixels by filtering the rendered samples and further generate a second subset of the output pixels by interpolating the first subset of pixels and the rendered samples. The graphics system operates at higher resolutions and refresh rates by interpolating a subset of the output pixels since filtering of the samples is computationally intensive. Different ratios of the number of first subset of pixels to the number of the second subset of pixels may be used. For example, a different ratio may be used for different regions of the display screen. A higher ratio of the number of first subset of pixels to the number of second subset of pixels may be used for regions of the screen where a higher quality image is desired and a lower ratio may be used for regions where a lower quality image may be sufficient.

Claim 23 recites a method for calculating values for pixels of an image that includes calculating in anti-aliasing circuitry sample values for pixels of the image in accordance with a plurality of sampling rates, a sampling rate defined by the number of samples per pixel and at least one sample per pixel, each sample having a corresponding sample value calculated, the sampling rate differing for at least two pixels of the image and alternating per pixel for consecutive pixels along lines parallel to one or the other axes of the image for at least some of the horizontal or vertical lines of pixels of the image, the at least two pixels having the differing

sampling rates belonging to a sampling rate set, the sampling rate set repeated for the pixels along the horizontal or vertical lines; calculating in the anti-aliasing circuitry a respective value for each pixel of the image from all the sample values for the pixel, every sample per pixel having a corresponding sample value for the calculation; and storing in a memory the values for the pixels as graphics data to be used for providing an anti-aliased image to be displayed on a display device.

The Deering patent fails to disclose the combination of limitations recited by claim 23. For example, claim 23 fails to disclose calculating in anti-aliasing circuitry sample values for pixels of the image in accordance with a plurality of sampling rates, a sampling rate defined by the number of samples per pixel and at least one sample per pixel, each sample having a corresponding sample value calculated, the sampling rate differing for at least two pixels of the image and alternating per pixel for consecutive pixels along lines parallel to one or the other axes of the image for at least some of the horizontal or vertical lines of pixels of the image, the at least two pixels having the differing sampling rates belonging to a sampling rate set, the sampling rate set repeated for the pixels along the horizontal or vertical lines. The Deering patent further fails to disclose calculating in the anti-aliasing circuitry a respective value for each pixel of the image from all the sample values for the pixel, every sample per pixel having a corresponding sample value for the calculation.

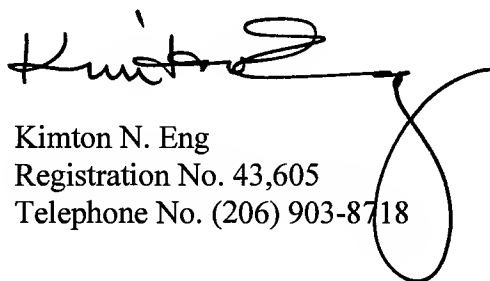
Claim 27 is patentably distinct from the Deering patent as well. Claim 27 recites a method for calculating values for pixels of an image that includes calculating in anti-aliasing circuitry sample values for pixels of the image in accordance with first and second sampling rates, a sampling rate defined by the number of samples per pixel and at least one sample per pixel, each sample having a corresponding sample value calculated, the sampling rate remaining constant for consecutive pixels arranged along any one given line parallel to the first axis and varying between the first and second sampling rates for consecutive pixels arranged along any one given line parallel to the second axis; calculating in the anti-aliasing circuitry a respective value for each pixel of the image from all the calculated sample values for the pixel, every sample per pixel having a corresponding sample value for the calculation; and providing from the anti-aliasing circuit the calculated values to be used in generating graphics data for an anti-aliased image to be displayed on a display device.

The Deering patent fails to disclose the combination of limitations recited by claim 27. For example, the Deering patent fails to disclose calculating in anti-aliasing circuitry sample values for pixels of the image in accordance with first and second sampling rates, a sampling rate defined by the number of samples per pixel and at least one sample per pixel, each sample having a corresponding sample value calculated, the sampling rate remaining constant for consecutive pixels arranged along any one given line parallel to the first axis and varying between the first and second sampling rates for consecutive pixels arranged along any one given line parallel to the second axis. The Deering patent further fails to disclose calculating in the anti-aliasing circuitry a respective value for each pixel of the image from all the calculated sample values for the pixel, every sample per pixel having a corresponding sample value for the calculation.

For the foregoing reasons, claims 23 and 27 are patentably distinct from the Deering patent. Claims 25, 26, and 28-32 are also patentably distinct from the Deering patent based on at least their dependency from a respective allowable base claim. Therefore, the rejection of claims 23 and 25-32 under 35 U.S.C. 102(e) should be withdrawn.

All of the claims in the application are in condition for allowance. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,
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